

AMENDMENTS TO THE CLAIMS:

Please cancel without prejudice claims 6, 33 and 55-63 and amend claims 1, 34-38, 41 and 43 as follows.

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) A ranging apparatus comprising:
an illumination means for illuminating a scene with a projected two dimensional array of light spots;
a detector for detecting the location of each of said spots in the scene; and
a processor adapted to determine, from the detected location of ~~a spot~~said spots in the scene, the range to ~~that spot~~those spots, wherein the illumination means comprises a light source arranged to illuminate only part of the input face of a light guide, the light guide comprising a tube having substantially reflective sides and being arranged together with projection optics so as to project an array of distinct images of the light source towards the scene.

2. (original) A ranging apparatus as claimed in claim 1 wherein the illumination means and detector are arranged such that each spot in the projected array appears to move in the detected scene, from one range to another, along an axis and the axis of apparent motion of each adjacent spot in the projected array is different.

3. (previously presented) A ranging apparatus as claimed in claim 1 wherein the illumination means is adapted to project an array of spots which is focussed at a first distance

and unfocussed at a second distance, the first and second distances being within the operating range of the apparatus.

4. (original) A ranging apparatus as claimed in claim 3 wherein the illumination means is adapted to project an array of spots which are non-circular in shape when focussed.

5. (previously presented) A ranging apparatus as claimed in claim 1 wherein the processor is adapted to resolve any possible ambiguity in range to each spot.

6. (cancelled).

7. (previously presented) A ranging apparatus as claimed in claim 1 wherein the illumination means is adapted to periodically alter the two dimensional array of projected spots.

8. (original) A ranging apparatus as claimed in claim 7 wherein the illumination means is adapted to illuminate the scene cyclically with different arrays of spots.

9. (original) A ranging apparatus as claimed in claim 7 wherein the processor is adapted to determine any areas of ambiguity in the detected array and deactivate one or more of the projected spots so as to resolve the ambiguity.

10. (previously presented) A ranging apparatus as claimed in claim 1 wherein the illumination means is adapted to so as to produce an array of spots wherein at least some projected spots have a different characteristic to adjacent spots.

11. (original) A ranging apparatus as claimed in claim 10 wherein the characteristic is colour.

12. (previously presented) A ranging apparatus as claimed in claim 10 wherein the characteristic is shape.

13. (previously presented) A ranging apparatus as claimed in claim 1 wherein the spots comprise intersections between continuous lines.

14. (original) A ranging apparatus as claimed in claim 13 wherein the illumination means projects two sets of regularly spaced lines, the two sets of lines being substantially orthogonal.

15. (original) A ranging apparatus as claimed in claim 14 wherein the processor is adapted to determine the range to the intersections between the continuous lines and then, using the determined range information determine the range to other points on the continuous lines.

16. (previously presented) A ranging apparatus as claimed in claim 1 wherein the detector comprises a two dimensional CCD or CMOS array.

17. (previously presented) A ranging apparatus as claimed in claim 1 wherein the illumination means is adapted such that the two dimensional array of spots are infrared spots.

18. (original) A ranging apparatus as claimed in claim 17 wherein the detector is adapted to capture a visible image of the scene as well as the location of the infrared spots in the scene.

19. (previously presented) A ranging apparatus as claimed in claim 1 wherein the baseline between the illumination means and the detector is between 50 and 100mm.

20. (previously presented) A ranging apparatus as claimed in claim 1 wherein the detection system is adapted to image the scene from more than one direction.

21. (original) A ranging apparatus as claimed in claim 18 wherein the apparatus includes scanning optics in the optical path to the detector adapted to periodically redirect the viewing direction of the detector.

22. (original) A ranging apparatus as claimed in claim 20 wherein the detector comprises two detector arrays each detector array arranged so as to image the scene from a different direction.

23. (previously presented) A ranging apparatus as claimed in claim 1 wherein the apparatus comprises a plurality of detectors, each arranged to image a scene from a different direction.

24. (previously presented) A ranging apparatus as claimed in claim 20 wherein the processor applies image processing algorithms to the scenes from each viewpoint to determine range information therefrom.

25. (previously presented) A ranging apparatus as claimed in claim 20 wherein the detector means is adapted to have a different baseline to the illumination means in each viewpoint.

26. (previously presented) A ranging apparatus as claimed in claim 20 wherein the processor is adapted to determine the possible range to the scene from each viewpoint and compare the possible ranges to resolve any ambiguity.

27. (previously presented) A ranging apparatus as claimed in claim 20 wherein the baseline of at least two of the viewpoints lie along different axes.

28. (previously presented) A ranging apparatus as claimed in claim 1 wherein the apparatus further comprises a plurality of illumination means arranged to illuminate the scene from different directions.

29. (previously presented) A ranging apparatus as claimed in claim 28 wherein the apparatus is adapted to periodically change the illumination means used to illuminate the scene.

30. (original) A ranging apparatus as claimed in claim 29 wherein the processor is adapted to determine the possible range to the scene when illuminated with each illumination means and compare the possible ranges to resolve any ambiguity.

31. (previously presented) A ranging apparatus as claimed in claim 28 wherein each illumination means is arranged to have a different baseline to the or each detector or detector array.

32. (previously presented) A ranging apparatus as claimed in claim 28 wherein at least two of the illumination means project spots having different characteristics.

33. (cancelled).

34. (currently amended) A ranging apparatus as claimed in claim ~~33~~1 wherein the light guide comprises a tube having a square cross section.

35. (currently amended) A ranging apparatus as claimed in claim ~~33~~1 wherein the light guide comprises a tube having reflective internal surfaces.

36. (currently amended) A ranging apparatus as claimed in claim ~~33~~1 wherein the light guide comprises a tube of solid material adapted such that a substantial amount of light incident at an interface between the material of the tube and surrounding material undergoes total internal reflection.

37. (currently amended) A ranging apparatus as claimed in claim ~~33~~1 wherein the projection optics comprises a projection lens.

38. (currently amended) A ranging apparatus as claimed in claim ~~33~~1 wherein the light source is arranged to illuminate the input face of the light guide through a mask.

39. (previously presented) A ranging apparatus as claimed in claim 27 wherein the light source illuminates the input face of the light guide with a non-circular shape.

40. (original) A ranging apparatus as claimed in claim 32 wherein the light source illuminates the input face of the light guide with a shape which is non symmetric about the axes of reflection of the light guide.

41. (currently amended) A ranging apparatus as claimed in claim ~~33~~1 wherein the illumination means comprises more than one light source, each light source arranged to illuminate part of the input face of the light guide.

42. (original) A ranging apparatus as claimed in claim 41 wherein the light sources are arranged in a regular pattern.

43. (currently amended) A ranging apparatus as claimed in ~~any of claims~~claim 41 wherein the light sources are arranged to provide differing spot densities.

44. (previously presented) A ranging apparatus as claimed in claim 41 wherein at least one light source emits light at a different wavelength to another light source.

45. (previously presented) A ranging apparatus as claimed in claim 41 wherein at least one light source is shaped differently to another light source.

46. (previously presented) A ranging apparatus as claimed in claim 41 wherein at least one light source has a shape which is not symmetric about a reflection axis of the light guide.

47. (previously presented) A ranging apparatus as claimed in claim 41 wherein at least one light source is located within the light guide at a different depth to another light source.

48. (previously presented) A ranging apparatus as claimed in claim 1 further comprising a means for periodically redirecting the array of spots in the scene.

49. (previously presented) A ranging apparatus as claimed in claim 1 further comprising a location sensor.

50. (previously presented) A proximity sensor incorporating a ranging apparatus as claimed in claim 1.

51. (previously presented) A target identification apparatus incorporating a ranging apparatus as claimed in claim 1.

52. (previously presented) An intruder detection system incorporating a ranging apparatus as claimed in claim 1.

53. (previously presented) A biometric modelling apparatus incorporating a ranging apparatus as claimed in claim 1.

54. (previously presented) A document scanner comprising an imager and a ranging apparatus as claimed in claim 1, wherein the imager is adapted to process the range information from the document to determine the extent of curvature thereof and process the detected image to correct for any curvature.

55. (cancelled).

56. (cancelled).

57. (cancelled).

58. (cancelled).

59. (cancelled).

60. (cancelled).

61. (cancelled).

62. (cancelled).

63. (cancelled).